NUI Galway
OÉ Gaillimh

Autumn Examinations 2009/ 2010

Exam Code(s)	4IF121
Exam(s)	B.Sc. in Information Technology
Module Code(s)	CT417
Module(s)	Software Engineering III
Paper No.	1
Repeat Paper	Y
External Examiner(s)	Prof. Michael O'Boyle
Internal Examiner(s)	Dr. Jim Duggan Dr. Owen Molloy Ms. Karen Young Ms. Pat Byrne
Instructions:	Candidates should attempt four questions, two questions from each section. All questions carry equal marks ***Use separate answer books for each section***.
Duration	3 hours
No. of Pages	3

SECTION A

1. (a) An electricity supply company is planning to change its billing system. Instead of sending out meter readers to manually record the meter readings each month, they now plan to equip them with hand-held wireless devices into which they key the reading and then upload the values to the server immediately. They new system requires that readings are now taken every two months instead of monthly. Draw up a top-level work breakdown structure for this system, listing the important milestones. [10]

What HR problems might you anticipate during implementation of this system, and what suggestions have you for solving them? [5]

(b) Describe how you might develop and use the project performance technique Earned Value Management (EVM) to track the ongoing benefits of the above system. [10]

2. (a) The following table describes the tasks for the data gathering and proposal phases of the SDLC of a software development project, with task duration in days.

Activity	Predecessor	Duration
A. Conduct interviews	None	3
B. Administer questionnaires	A	4
C. Read company reports	None	4
D. Analyse data flow	B,C	8
E. Introduce prototype	B,C	5
F. Observe reaction to prototype	E	3
G. Perform cost-benefits analysis	D	3
H. Prepare proposal	G,F	2
I. Present proposal	H	2

Draw a Gantt chart for this project.
Draw a network diagram for this project and calculate the critical path. [15]

(b) One of the most important tasks for a project manager is to assign the people who have the appropriate skills to work on each task, and to ensure none of the team are either overcommitted or without work for a period. Describe some techniques which may be used in managing the team members in a software development project. [10]

3. (a) Agile and Unified Process models represent two very different approaches to the development of software systems.

(i) Compare and contrast these approaches paying particular attention to their respective approaches to change management and risk management. **[8]**

(ii) Which approach would you recommend (and indicate why) for the development of the electricity supply company billing system (in Q.1(a) above)? **[4]**

(b) You have been appointed a software project manager for a new software games development company. Your job is to build a breakthrough product that combines a new gaming console with state-of-the-art software. Because competition for the home entertainment market is intense, there is significant pressure to get the job done.

(i) Create a risk table for this project. **[7]**

(ii) Identify a risk monitoring strategy and specific risk monitoring activities for three of these risks, clearly indicating the factors you will be monitoring. **[6]**

4. (a) You have been asked to undertake a new project introducing self-checkout registers in the university bookstore. Create a WBS for this project identifying all level 1 categories. Then break one of the level 1 items down to the third level. **[8]**

(b) Using your choice of estimation method, develop an effort and duration estimate for the introduction of the self-checkout registers in the university bookstore. **[7]**

(c) Given that requirements changes will arise, what advice would you give a project manager, new to your organisation, for handling user change requests? **[5]**

(d) Distinguish between ‘known risks’ and ‘unpredictable risks’. **[5]**

SECTION B

(Quality – Dr. Owen Molloy)

5. (a) Explain what is meant by a Quality Model, and the relevance of quality attributes and how they are measured. **[10]**

   (c) You are asked to carry out a Kano analysis of a company's web site. Explain how you would carry this out and how you would present your results. **[15]**

6. (a) You have been asked to initiate a project to improve software error rates in a development team. Describe the main steps you would take**. [10]**

   (b) Explain how Voice-Of-The-Customer analysis works and how you might carry it out for a software product. **[15]**

7. (a) Using an example (for example a mobile phone), explain how the Quality Function Deployment Diagram / House of Quality can be used to assess various aspects of a products features. **[10]**

   (b) You have recently joined the QA team in a large software organisation. You have been asked to initiate a process for Code Reviews. Describe the following: **[15]**

   - The advantages of performing code reviews
   - Potential issues which might be encountered
   - The roles which you think should be filled in each review team
   - How reviews should be conducted

8. (a) You have noticed that there is a large degree of variability in the defect rates achieved in different software projects. Explain what the cause of this variability might be. **[5]**

   (b) Describe how you would conduct Root Cause Analysis to analyse the defect problem outlined in 8(b) above. **[10]**

   (c) Describe (using examples) how tools such as Check Sheets, Pareto Charts, Histograms, Scatter Charts and Control Charts might be used to help in your analysis. **[10]**